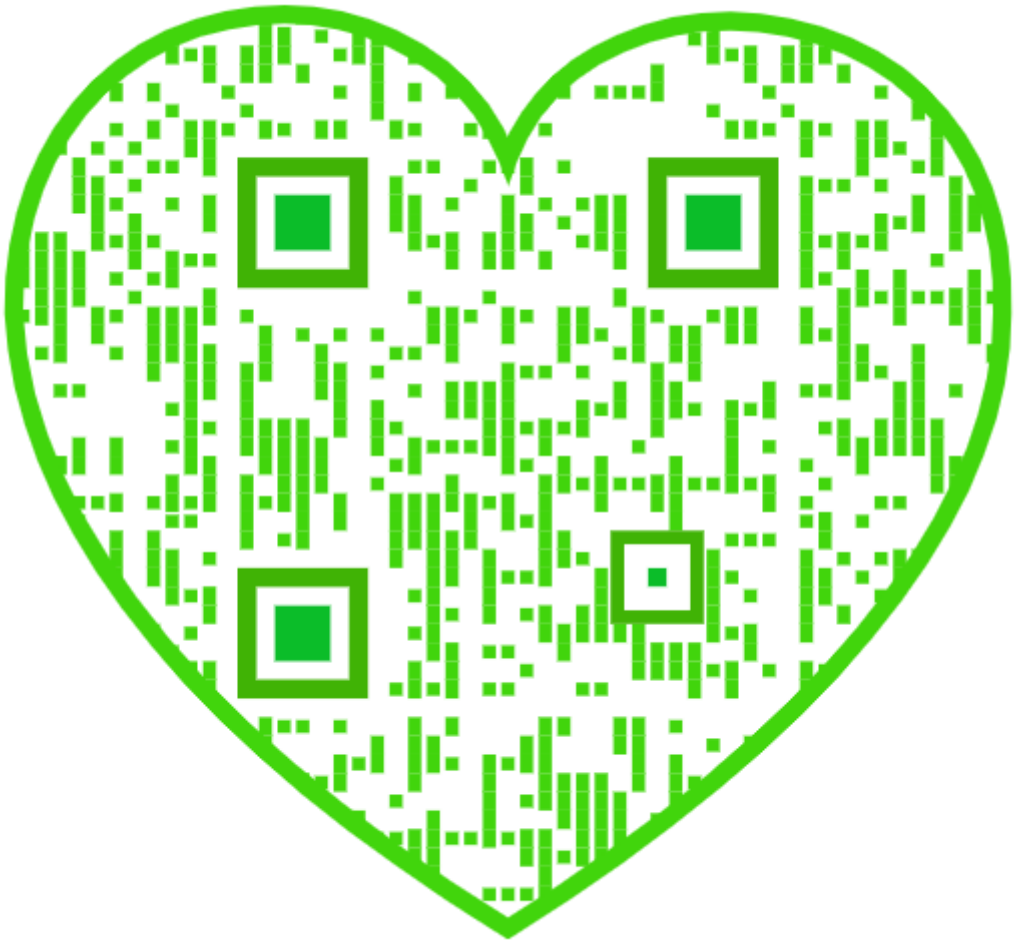
Master in Artificial Intelligence

Algorithm Selection & Development XXI



Purpose

The purpose of the section is to help you learn how to research, select, and develop appropriate algorithms to become a Successful Artificial Intelligence (AI) Engineer

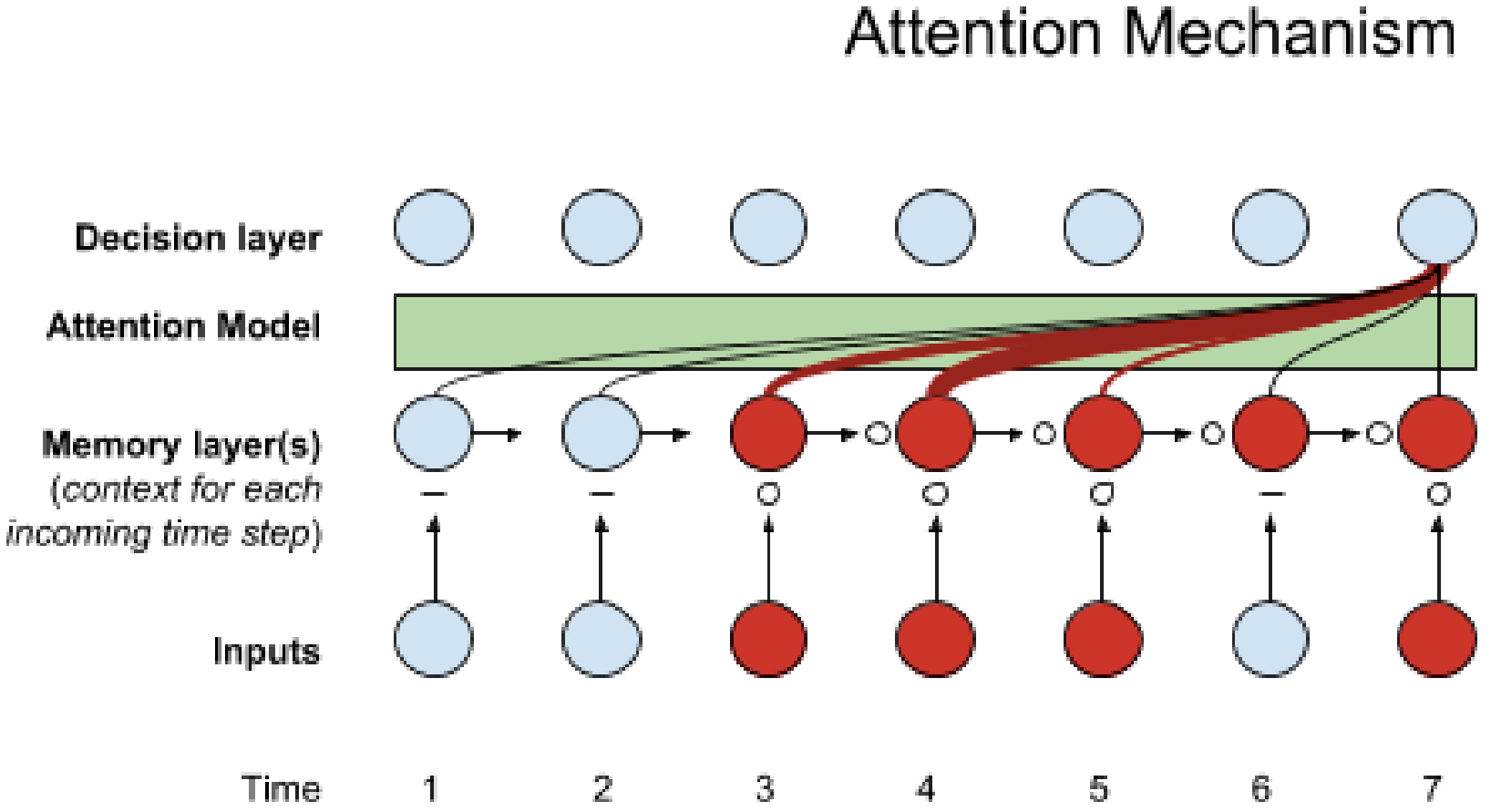
At the end of this lecture, you will learn the following

- **What are attention mechanisms in deep learning models to consider the interpretability and explainability of the selected models**

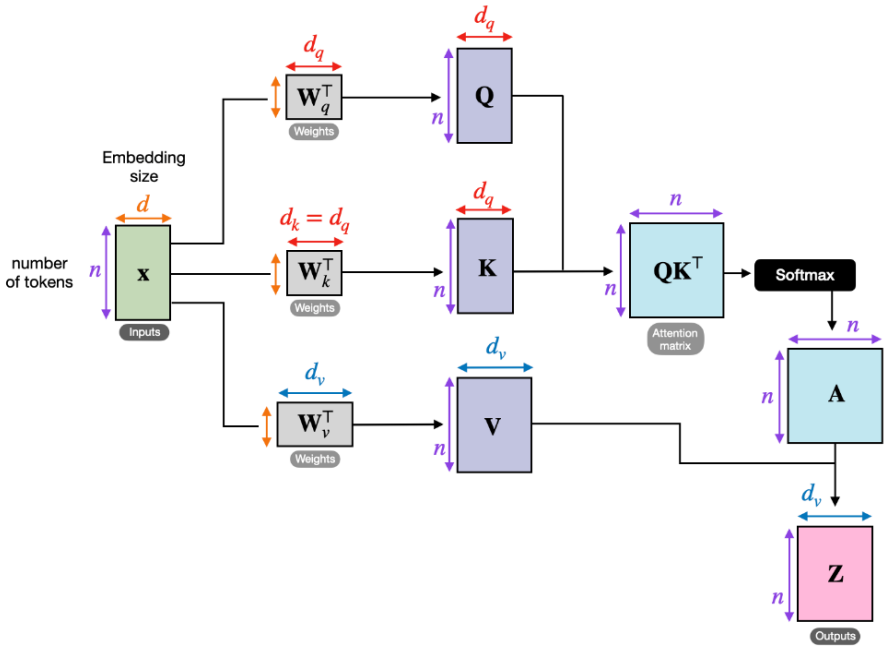
What are attention mechanisms in deep learning models to consider the interpretability and explainability of the selected models

Interpretability and Explainability techniques

- Feature importance analysis
- Model interpretability methods
  - SHAP values
  - LIME
- Attention mechanisms in deep learning models


Attention Mechanism
Decision layer
Attention Model
Memory layer(s)
(context for each
incoming time step)
Inputs
Time
1
2
3
4
5
6
7

Self-Attention Mechanism



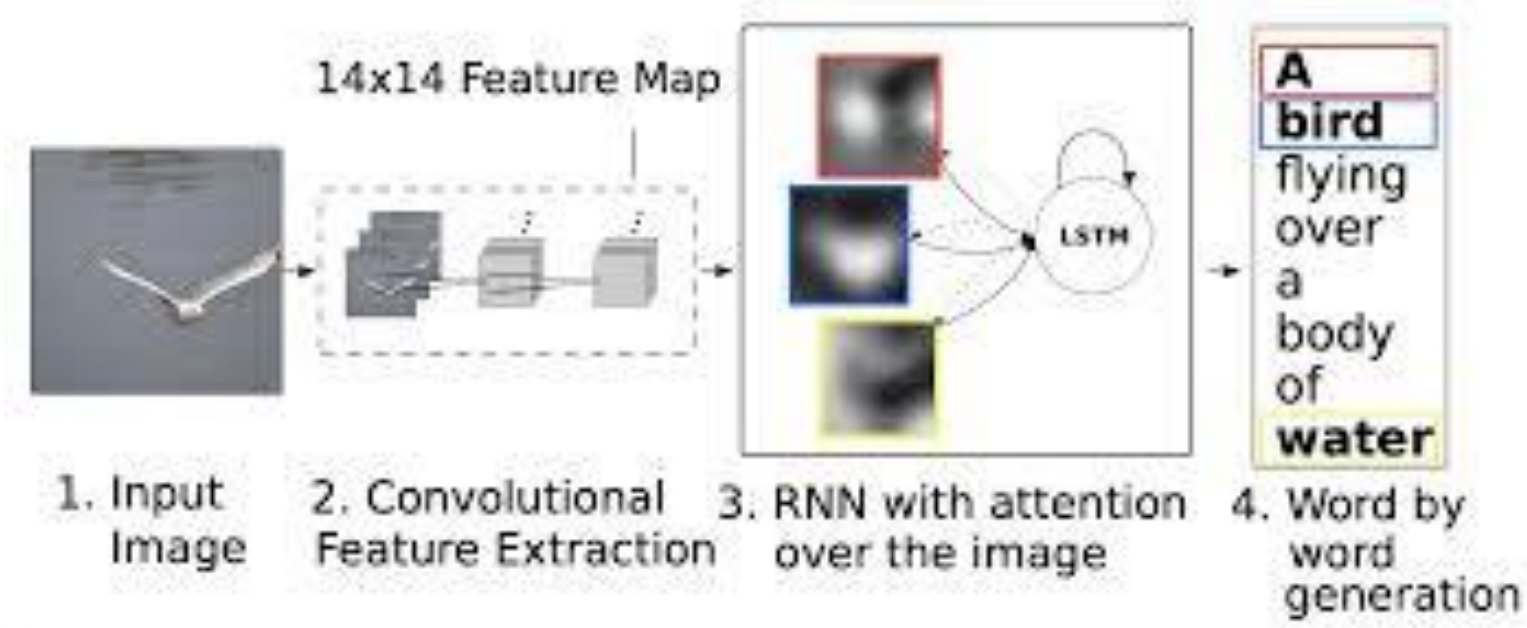
Interpretability

- Visualizing attention weights, one can see which parts of the input sequence are attended to more heavily during the prediction process
- Providing insights into the model's decision-making process.

Explainability

- Attention weights can be used to explain model predictions
- Highlighting the words or tokens that contribute most to the output

Visual Attention Mechanism



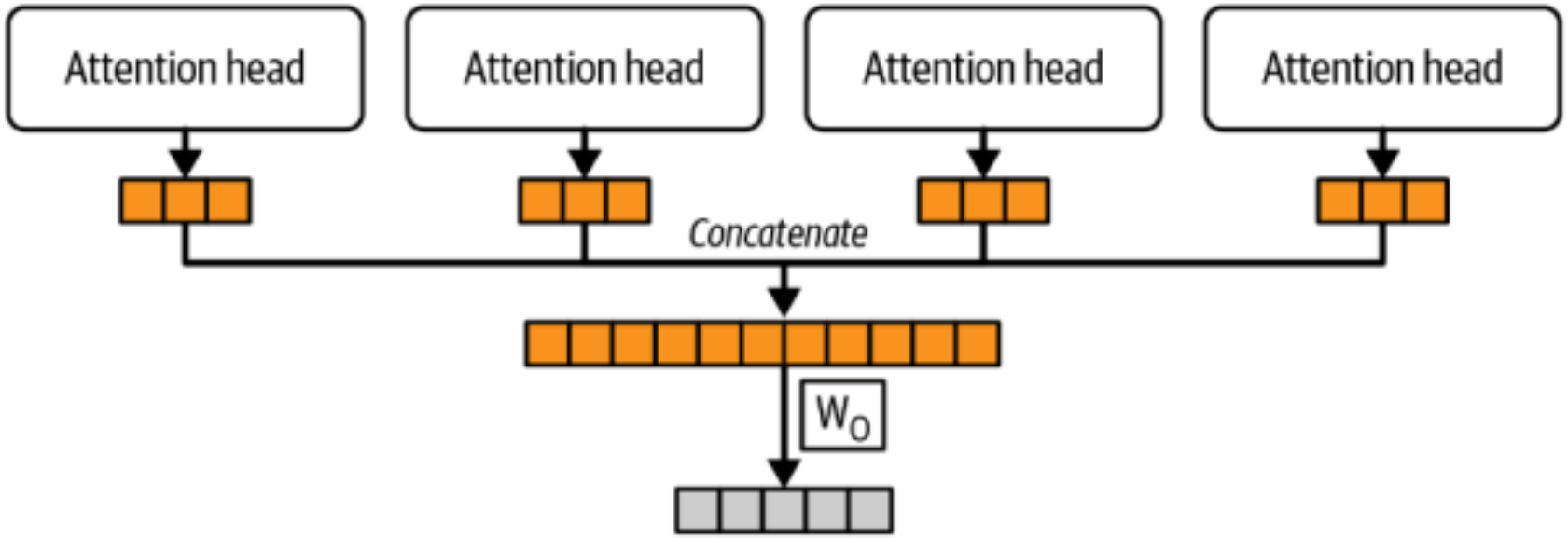
Interpretability

- Visualizing the attention maps can reveal which regions of the input image are important for the model's predictions
- Helping users understand where the model is looking and what features it is focusing on

Explainability

- Attention maps provide a visual explanation of the model's decision-making process by
- Highlighting the salient regions of the input image that influence the output

Multi-Head Attention



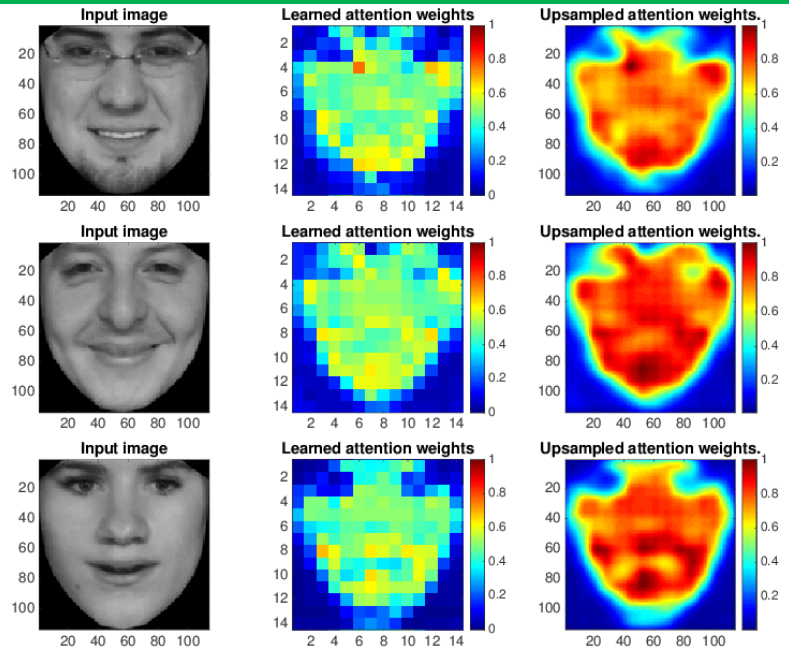
Interpretability:

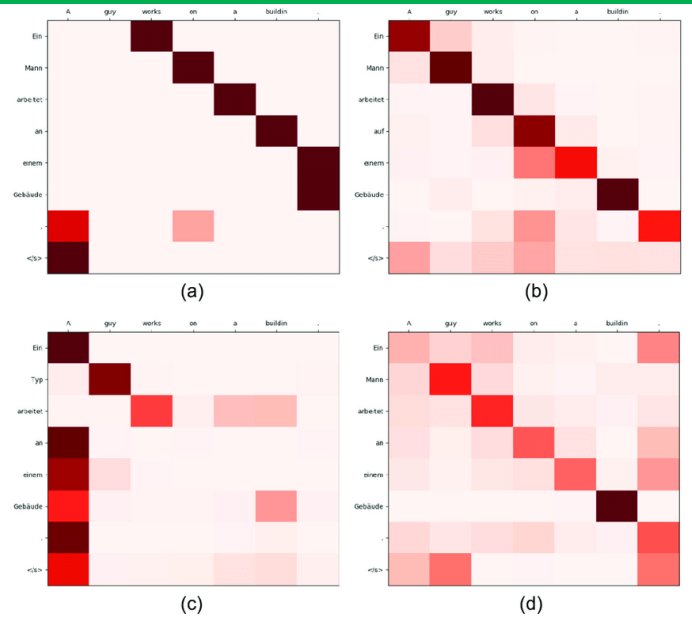
- Can gain a more comprehensive understanding
- How different parts of the input interact and influence the model's predictions.

Explainability:

- Capturing various aspects of the input data
- Their contributions to the output

Attention Visualization Techniques





SpanBert - SQuAD

Question: who is not an entrepreneur ?

Context: steven is an author . annie is an entrepreneur .

Answer: Annie

Interpretability

- Provide intuitive and interpretable representations of attention weights
- Making it easier to understand how the model processes input data.

Explainability

- Can gain insights into the model's decision-making process
- Understand which features or components are most influential for specific predictions

What are attention mechanisms in deep learning models to consider the interpretability and explainability of the selected models

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What is next?

How to research, select, and develop appropriate algorithms

Deployment and Monitoring

- Deploy the trained model in a production environment and integrate it into the application workflow
- Implement monitoring and logging mechanisms to track model performance, drift, and errors over time
- Continuously evaluate and update the model as new data becomes available or the problem requirements change

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